

WHAT IS CLAIMED IS:

1. A write driver for magnetic recording, comprising:
at least one photoconductive switch positioned adjacent a magnetic recording head for generating current waveforms;
DC conductors for supplying a DC voltage to said photoconductive switch;
means for supplying light to said photoconductive switch; and
recording head means for writing to a storage medium in response to current waveforms generated by said photoconductive switch.
2. The write driver of claim 1, wherein said photoconductive switch comprises a semiconducting substrate comprising a material selected from the group of silicon, silicon-on-sapphire (SOS), low-temperature-grown GaAs, semi-insulating GaAs, SiGe, and SiO₂/Si₃N₄.
3. The write driver of claim 1, wherein said photoconductive switch switches said DC voltage to produce a fast risetime write current when said switch is optically illuminated.
4. The write driver of claim 1, wherein said photoconductive switch comprises a metal-semiconductor-metal configuration.
5. The write driver of claim 1, wherein said DC conductors comprise at least one positive electrode, at least one negative electrode and a ground.
6. The write driver of claim 5, wherein said DC conductors comprise a single voltage electrode and a ground on a suspension.
7. The write driver of claim 1, wherein said photoconductive switch comprises a gap between at least two DC conductors.
8. The write driver of claim 1, wherein said means for supplying light comprise a laser.
9. The write driver of claim 1, wherein said means of supplying light includes at least one optical fiber for directing light from a light source to said photoconductive switch.

10. The write driver of claim 1, wherein said means of supplying light includes at least one mirror or lens for directing light from a light source to said photoconductive switch.

11. The write driver of claim 1, wherein said recording head means are structured and arranged for perpendicular recording to said storage medium.

12. The write driver of claim 1, wherein said recording head means are structured and arranged for longitudinal recording to said storage medium.

13. The write driver of claim 1, wherein said recording head means includes a read device.

14. The write driver of claim 1, wherein said means for writing to a storage medium comprise a recording head having at least one recording head conductor structured and arranged to receive current waveforms from said photoconductive switch and to communicate said current waveforms to a write pole structured and arranged for magnetic recording.

15. The write driver of claim 1, wherein said means for writing to a storage medium comprises a pair of write poles with a connecting yoke therebetween, said pair of write poles structured and arranged to apply a magnetic write field to a magnetic storage medium.

16. The write driver of claim 1, wherein said means for writing to a storage medium comprises a pair of write poles having a connecting yoke therebetween, structured and arranged to apply a magnetic write field to a magnetic storage medium, having two coils of opposite polarity wound around said yoke.

17. The write driver of claim 1, further comprising a slider positioned adjacent said recording head means for positioning said recording head in magnetic communication with said storage medium.

18. The write driver of claim 1, further comprising a suspension, said suspension supporting at least one of said at least one photoconductive switch, said DC conductors for supplying a DC voltage, said means for supplying light, and said recording head means for writing to a storage medium.

19. The write driver of claim 1, further comprising an interconnect for carrying current from said photoconductive switch to said recording head means.

20. The write driver of claim 19, wherein said interconnect is from about 0.1 to about 2 mm in length.

21. The photoconductive optical write driver of claim 1, further comprising a transmission line positioned between said DC conductors having an applied DC voltage and said photoconductive switch, said recording head means for writing to a storage medium including means for discharging a charged section of said transmission line through said photoconductive switch.

22. The write driver of claim 21, wherein said transmission line comprises a coaxial cable.

23. The write driver of claim 1, further comprising a preamp for pulsed field writing.

24. A recording device for use with magnetic storage media, comprising:

a write driver, comprising:

at least one photoconductive switch positioned adjacent a magnetic recording head for generating current waveforms;

DC conductors for supplying a DC voltage to said photoconductive switch;

means for supplying light to said photoconductive switch;

and

means for writing to a storage medium in response to current waveforms generated by said photoconductive switch.

25. The recording head of claim 24 wherein, said means for supplying light comprise a laser.

26. The recording head of claim 24 wherein, said means for supplying light includes at least one optical fiber for directing light from a light source to said photoconductive switch.

27. The recording head of claim 24 wherein, said means for writing to a storage medium comprise a write pole structured and arranged for perpendicular or longitudinal recording to said storage medium.

28. The recording head of claim 24 wherein, said means for writing to a storage medium comprise a pair of write poles with a connecting yoke therebetween, structured and arranged to apply a magnetic write field to said storage medium.

29. The recording head of claim 24 wherein, said means for writing to a storage medium comprise a pair of write poles having a connecting yoke therebetween, structured and arranged to apply a magnetic write field to said storage medium, and having two coils of opposite polarity wound around said yoke.

30. A magnetic disc drive storage system, comprising:
a housing;
a rotatable magnetic storage medium positioned in said housing, said magnetic storage medium having a plurality of magnetic tracks, each of the tracks having a plurality of magnetic domains; and
a movable device mounted in said housing adjacent said magnetic storage medium,

said device including a photoconductive optical write driver for magnetic recording, said photoconductive optical write driver comprising:

at least one photoconductive switch positioned adjacent a magnetic device for generating current waveforms;

DC conductors for supplying a DC voltage to said photoconductive switch;

means for supplying light to said photoconductive switch;

and

means for writing to a storage medium in response to current waveforms generated by said photoconductive switch.

31. The recording head of claim 30 wherein, said means for supplying light comprise a laser.

32. The recording head of claim 30 wherein, said means for supplying light includes at least one optical fiber for directing light from a light source to said photoconductive switch.

33. The recording head of claim 30 wherein, said means for writing to a storage medium comprise a write pole structured and arranged for perpendicular or longitudinal recording to said storage medium.

34. The recording head of claim 30 wherein, said means for writing to a storage medium comprise a pair of write poles with a connecting yoke therebetween, structured and arranged to apply a magnetic write field to said storage medium.

35. The recording head of claim 30 wherein, said means for writing to a storage medium comprise a pair of write poles having a connecting yoke therebetween, structured and arranged to apply a magnetic write field to said storage medium, and having two coils of opposite polarity wound around said yoke.